

In the Claims:

1. A downhole tool comprising:
a body adapted to be incorporated in a string of tubing for carrying fluid from surface towards a distal end of the string, the body defining a bore and comprising a valve arrangement including at least one flow port in the wall of the body and whereby the port may be selectively opened and sealed closed; and
a variable flow restriction in the bore responsive to flow from surface towards the distal end of the string through the tubing, the degree of restriction tending to decrease as flow across the restriction increases.
2. The tool of claim 1, wherein the variable flow restriction is adapted to control fluid flow through the body bore below the ports.
3. The tool of claim 2, wherein the variable flow restriction is adapted to selectively close the bore below the flow port.
4. The tool of claim 1, wherein the variable flow restriction is adapted to create a pressure differential and the resulting force utilised to actuate the valve arrangement.
5. The tool of claim 1, wherein the valve arrangement is biased towards an open configuration.
6. The tool of claim 1, wherein valve arrangement is biased towards a closed configuration.
7. The tool of claim 1, wherein the valve arrangement is initially retained in one of an open configuration and a closed configuration.
8. The tool of claim 7, wherein after release from the initial configuration the valve

arrangement tends to move to the other configuration.

9. The tool of claim 1, wherein the valve arrangement includes control means for at least one of controlling the sequence of operation of the valve arrangement and controlling the response of the valve arrangement to actuation forces.

10. The tool of claim 1, wherein the valve arrangement is adapted to be actuated by a differential fluid pressure acting across at least one flow restriction in the bore.

11. The tool of claim 10, wherein said flow restriction is provided, at least in part, by at least one of:

the variable flow restriction;

further flow restriction; and

a combination of the variable flow restriction and the further flow restriction.

12. The tool of claim 11, wherein the further flow restriction is one of a fixed restriction and a variable restriction.

13. The tool of claim 11, wherein the further flow restriction is provided as a separate unit adapted to be selectively located in the body.

14. The tool of claim 11, wherein the further flow restriction is provided above said variable flow restriction.

15. The tool of claim 1, wherein the variable flow restriction features a tight configuration in which the restriction substantially closes the body bore.

16. The tool of claims 15, wherein in the tight configuration the variable flow restriction is configured to permit pressure equalisation thereacross.

17. The tool of claim 1, wherein the variable flow restriction features a tight

configuration in which the flow restriction allows flow through the bore.

18. The tool of claim 1, wherein the variable flow restriction is positioned upstream of the flow port.

19. The tool of claim 1, wherein the variable flow restriction is positioned downstream of the flow port.

20. The tool of claim 1, wherein the variable flow restriction is integral with the body.

21. The tool of claim 1, wherein the variable flow restriction is provided as a separate unit adapted to be selectively located in the body.

22. A method of controlling flow between a tubular downhole string and a surrounding annulus, the method comprising:

providing a valve arrangement in a tubular downhole string, the valve arrangement having a flow port providing fluid communication between the string bore and the surrounding annulus and a variable flow restriction;

pumping fluid through the string;

selectively configuring the valve arrangement to open the flow port;

selectively configuring the valve arrangement to close the flow port; and

increasing the flow rate through the flow restriction to decrease the degree of restriction provided by the flow restriction.

23. The method of claim 22, comprising varying the configuration of the variable flow restriction to control fluid flow through the body bore below the ports.

24. The method of claim 22, comprising utilising the variable flow restriction to close the bore below the flow port, such that all of the fluid is directed through the flow port.

25. The method of claim 22, comprising utilising the variable flow restriction to create

a pressure differential and utilising the resulting force to actuate the valve arrangement.

26. The method of claim 22, comprising biasing the valve arrangement such that the port is normally open.

27. The method of claim 22, comprising initially retaining the valve arrangement in one of an open configuration and a closed configuration.

28. The method of claim 22, comprising actuating the valve arrangement by a differential fluid pressure acting across at least one further flow restriction in the bore.

29. The method of claim 28, comprising providing a further flow restriction as a separate unit and dropping the further flow restriction into the body.

30. The method of claim 22, comprising configuring the variable flow restriction to close the body bore.

31. The method of claim 22, comprising utilising the variable flow restriction to direct substantially all of the fluid flowing into the tool through the flow port

32. A fluid actuated tool comprising:

a body comprising a valve arrangement including at least one flow port in a wall of the body and whereby the port may be selectively opened and closed; and

a flow restriction operatively associated with the valve arrangement and upstream of the at least one flow port whereby fluid flow through the restriction creates a valve-actuating force and whereby the flow restriction has a variable, flow-related configuration.

33. The tool of claim 32, wherein the restriction is adapted to reconfigure to define a larger flow area on experiencing a pressure differential force above a predetermined level.

34. The tool of claim 33, wherein part of the restriction is spring-mounted, such that the part moves when the differential pressure force acting on the part overcomes the spring force.

35. The tool of claim 34, wherein movement of the part is damped.

36. A method of controlling fluid flow in a downhole tubular string comprising:

- providing a valve arrangement in a string, the valve arrangement including a flow port providing fluid communication between the string's bore and the surrounding annulus;

- providing a flow restriction in the string upstream of the flow port;

- flowing fluid through the restriction to actuate the valve arrangement; and

- varying the configuration of the restriction.

37. A tool comprising a body including a fluid actuated device including a flow restriction whereby fluid flow through the restriction creates an actuating force and whereby the flow restriction has a variable, flow-related configuration.

38. A downhole tool comprising:

- a body adapted to be incorporated in a string of tubing for carrying fluid from surface towards a distal end of the string, the body defining a bore and comprising a valve arrangement including at least one flow port in the wall of the body and whereby the port may be selectively maintained open and closed; and

- a variable flow restriction in the bore responsive to flow from surface towards the distal end of the string through the tubing, the degree of restriction tending to decrease as flow across the restriction increases.